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"The head of a comet seems therefore to be merely a meteor-swarm containing so much gaseous material that when electrified by its approach to the Sun, it will be rendered luminous. When the gases, by successive discharge and loss into space, have become too rare to be rendered visible in this manner, the object, if discovered, is known simply as a meteor-swarm. Each meteor in the comet's head, when remote from the Sun, is surrounded by its own individual atmosphere of hydrocarbons, etc., in a solid condition. When this atmosphere is sufficiently warmed by the Sun's rays to evaporate, it becomes sufficiently electrified to partially overcome the slight force of gravity of the meteors, and a portion of it escapes and unites with that of other meteors to form the tail. Thus, if the meteors and their atmospheres are sufficiently widely separated from each other, the comet may be brilliant and yet transparent at the same time."

No space remains to speak in detail of other interesting researches in these volumes. Long-continued observations on the Moon prove the existence of changes on its surface, of vegetation, of a slight atmosphere, according to Mr. PICKERING. As many of his conclusions are in the nature of discoveries, they will not pass unchallenged, and it is not difficult to point out paragraphs where more evidence is very desirable. At the same time, it is only just to say that the treatment of all the topics in the volume is suggestive, and thus very valuable, though it is often inconclusive, being based on too slight and easily accepted foundations. Volume XXXIII is devoted to miscellaneous researches on the brightness of certain asteroids, on the Gegenschein and Zodiacal Light (by Professor SEARLE), on Variable Stars, Nebulæ, Comets, Satellites, etc. Taken together, the volumes contain results of long-continued and faithful work, intelligently directed.

THE CHABOT OBSERVATORY-DOLBEER ECLIPSE
EXPEDITION, MAY 28, 1900.

BY CHARLES BURCKHALTER.

The preparations for the expedition from this Observatory to observe the eclipse of May 28th next, at the expense of one of our members,—Mr. JOHN DOLBEER, of San Francisco,—are nearly completed. The Pierson eclipse telescope, with the Pardee lens attached, making two telescopes of four-inch aperture and fifteen feet focal length, is ready for shipment, and will be forwarded in a few days, to insure arrival in ample time.

The Southern Pacific Company and its connections, by the kindness of General Traffic Manager WILLIAM SPROULE, has granted less than half-rate for transportation of instruments. The station will be at or near Union Point, Georgia, and a leading man of the place, WILLIAM HART, Esq., has already placed me under obligations for valuable information and offers of help.

As the geographical position of the village is uncertain by as much as three miles or more, it will be necessary to observe for position—especially for latitude—before “establishing” the station. I expect to start in time to make the preliminary observations and be ready for actual installation of instruments by May 1st, which will give me ample but not unnecessary time for complete preparation. I have already received offers of volunteer assistance from Mr. HART and others, and I feel confident that I shall be in good hands, and it will be a real comfort, after the experiences of the last two expeditions, to be in a country where it will not be necessary to talk either through an interpreter or with my hands and feet.

In working out the controlling diaphragms, the exposure times are computed for each minute from 16' to 30' (counting from Sun's center), and thereafter for each two minutes, intermediate places giving intermediate times.

In the partial table below, the exposures are given for each minute from 16' to 20'; then at four-minute intervals, from 20' to 40', and thereafter at ten-minute intervals, except at 75' and 76', where numbers 1, 3, 7, and 9 end. It will be observed that numbers 2 and 8 apparently stop at 50' and 60'. Both of these, however, end at 95'; but, as they are experimental, they are not given in full.

Number 4 is Secretary ZIEL'S ideal exposure, after a study of the India negatives of the Pierson expedition. This curve I expect to be one of the very best, especially as I intend to bring him this plate and others for expert development. Number 8 is my own ideal, and may be said to be a “middle-of-the-road” exposure out to 64'.

The exposures will be made in pairs, five for each telescope, the times of each pair being identical, as the exposures begin and end simultaneously by electrical apparatus.

I shall use Cramer crown plates, and have entire confidence that the times indicated in the table cannot be far wrong, and that at least one plate will be nearly perfectly exposed. I am

especially confident that the time given at the Moon's edge is too much, rather than too little, and if I find at the end of the programme that I can make an additional exposure of two seconds, I have a diaphragm prepared that will give only $0.^{\circ}.01$ at the Moon's edge in a two seconds exposure.

The exposures given below can be made with great exactness, probably within two or three per cent. This is especially true for the extreme inner corona. For example, if number 6 should receive a total exposure of only 8^s instead of 10^s , as proposed, the exposure at $16'$ would be only $0.^{\circ}.04$ instead of $0.^{\circ}.05$. As the exposures are made by moving a lever to the right and left, engaging electrical contacts, they can be made with nearly the same precision as recording the transit of a star on the chronograph.

PROPOSED EXPOSURES, MAY 28, 1900.

Order of Exposure	No.	1	2	3	4	5	6	7	8	9	10
		s	s	s	s	s	s	s	s	s	s
Exposure at Moon's Limb		0.02	0.04	0.10	0.06	10.00	0.05	0.08	0.05	0.12	0.06
Total Exposure.		4.00	4.00	8.00	8.00	10.00	10.00	8.00	8.00	6.00	6.00
Exposure Counting from Center of Sun ... at $16'$		s	s	s	s	s	s	s	s	s	s
		0.02	0.04	0.10	0.06	10.00	0.05	0.08	0.05	0.12	0.06
	17	.04	.06	.16	.09		.12	.11	.10	.14	.08
	18	.08	.10	.24	.14		.18	.18	.15	.18	.12
	19	.12	.16	.36	.20		.29	.26	.22	.23	.18
	20	.18	.22	.50	.27		.41	.35	.30	.30	.25
	24	.42	.56	1.70	.55		1.00	.86	.73	.76	.62
	28	.78	1.06	3.22	.94		1.72	1.58	1.40	1.72	1.16
	32	1.21	1.70	4.56	1.48		2.20	2.42	2.18	3.14	1.96
	36	1.62	2.31	5.34	2.10		2.60	3.16	3.00	4.00	2.80
	40	2.00	2.85	5.90	2.85		3.00	3.83	4.00	4.50	3.42
	50	2.83	3.65	6.73	4.30		4.00	5.08	6.38	5.17	4.41
	60	3.52	...	7.36	5.40		5.00	6.25	7.50	5.56	5.02
	70	3.96	...	7.84	6.20		6.00	7.41	...	5.87	5.50
	75	3.99	...	8.00	...		...	8.0	...	6.00	...
	76	4.00	...	...	...		...	...	...	...	...
	80	...	...	...	6.90		7.00	...	...	...	5.84
	90	...	...	...	7.50		8.00	...	...	...	6.00
	95	...	...	...	...		...	...	...	...	...
	100	...	...	...	8.00		9.00	...	...	...	...
	110	...	...	...	...	10.00	10.00	...	...	...	...

CHABOT OBSERVATORY, Oakland, Cal., March 10, 1900.